TVA Water Testing Results

In general, levels of contaminants in water increase as flows increase and decrease as flows recede. The higher flows and higher water velocities cause small particles of solid materials to be suspended in the water column. From the graph showing both the flow and the total arsenic levels, you can see that the total arsenic increased when the flow in the Emory River increased following storm events on January 7 and January 29. Other parameters (e.g., lead, iron, etc.) tend to follow the same pattern. Concentrations of dissolved constituents typically are much lower than the total concentrations of the same constituents, but they also tend to increase and decrease with stream flow.

In the data presented here, you will see designations as "Total" or "Dissolved". When the word "Total" is used, that means that a water sample is taken directly as it comes out of the river, is treated with acid, and then analyzed. The intent of this procedure is to dissolve or extract constituents of interest from tiny particles of suspended clay, soil, sediment or ash so they can be measured along with the material that is truly dissolved in the water. When the description "Dissolved" is used, that means a water sample is first passed through a filter with a very small pore size before being treated with acid and then analyzed as noted above. The intent of this procedure is to remove the tiny particles of solid materials suspended in the water so that the analysis shows only the constituents truly dissolved in the water.

Only graphs for arsenic, flow, and total suspended solids are presented here, since arsenic is generally the constituent that is of greatest interest as a component of fly ash and it is strongly correlated with total suspended solids which is associated with high stream flow. In addition, as mentioned above, the patterns of concentrations of other constituents closely resemble the arsenic concentration patterns.
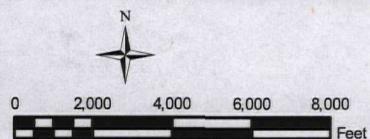
The map included shows sampling locations in the Emory, Clinch, and Tennessee Rivers.

TVA River Sampling Locations

ERM-13 ERM-11

ERM-5

ERM-12

ERM-4

ERM-3

ERM-2

ERM-1

CRM-7

CRM-3

CRM-6

CRM-4

CRM-5

ERM-0

CRM-2

CRM-1

TRM-567 CRM-0

TRM-568

TRM-566

TRM-569

TRM-570

TRM-564 TRM-565

TRM-571

N
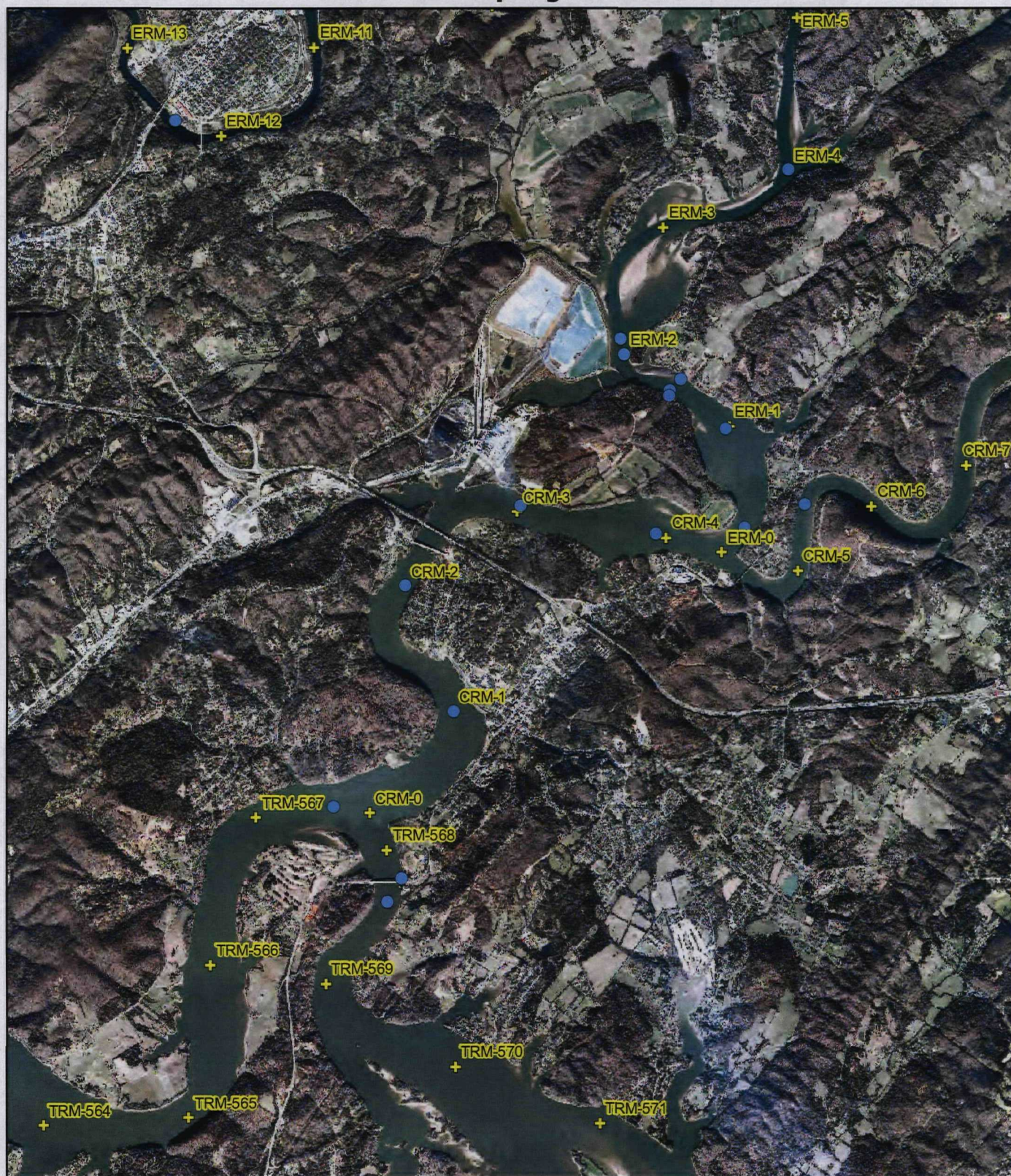
Legend

● Surface Water Sample Locations

✚ River Miles
   CRM - Clinch River Mile
   ERM - Emory River Mile
   TRM - Tennessee River Mile

0   2,000   4,000   6,000   8,000
Feet

Imagery Date: 2006
Sample Date: Through 02/20/2009
Map Compiled: 03/03/2009

Tennessee Valley Authority
OE&R - ER&S
Geographic Information & Engineering

Map Filename: SurfaceWaterSampling_20090225_8x11_v1.mxd

Figure 1
Highest Result of Total Arsenic with River Flow Overlay
TVA - Kingston - Emory River

Emory River Flow 21,404 CFS

Tennessee Fish and Aquatic Life Criterion for Continuous Arsenic Concentration
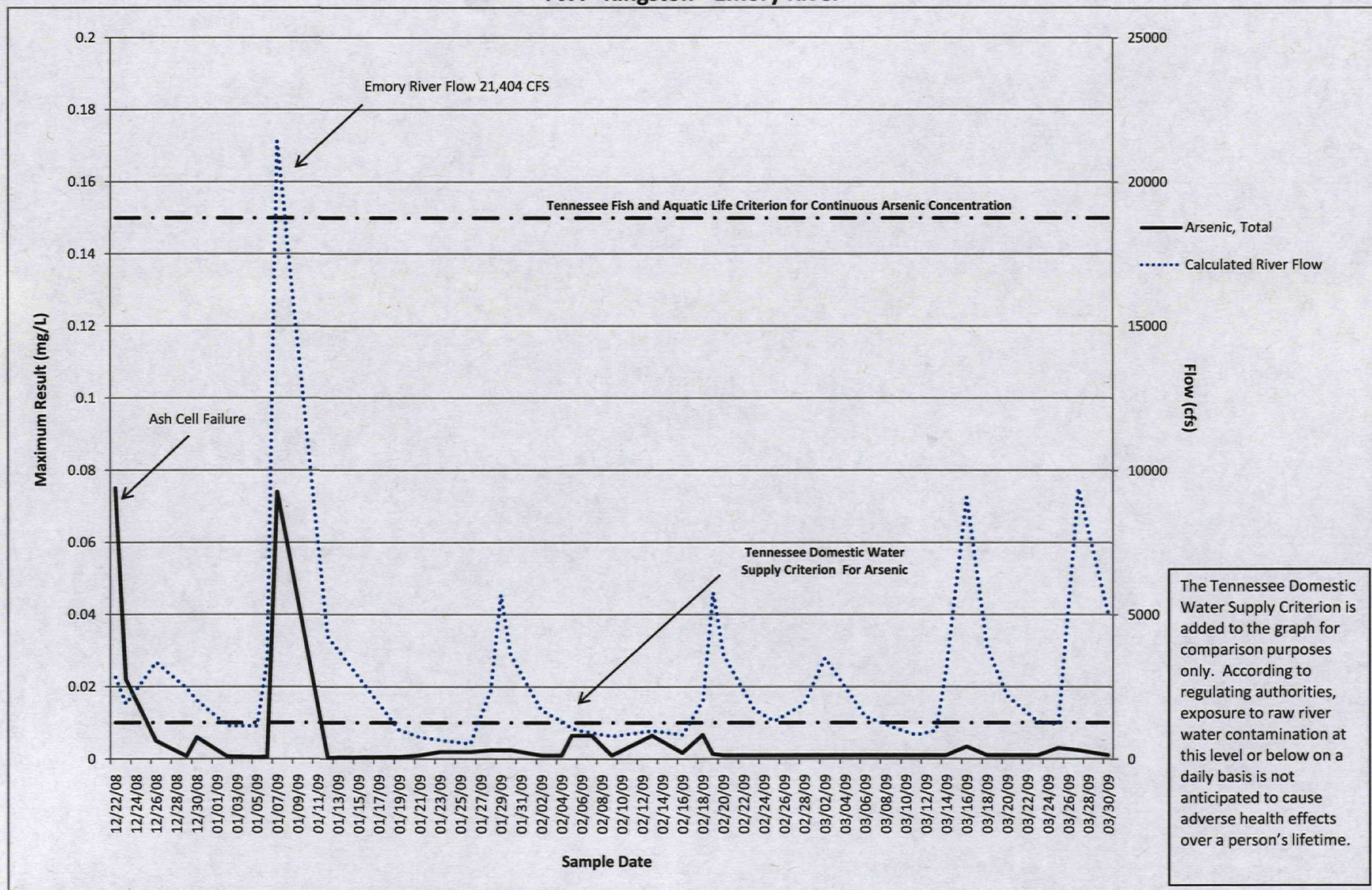
Ash Cell Failure

Tennessee Domestic Water
Supply Criterion For Arsenic

—— Arsenic, Total

········ Calculated River Flow

Maximum Result (mg/L)

Flow (cfs)

Sample Date

The Tennessee Domestic Water Supply Criterion is added to the graph for comparison purposes only. According to regulating authorities, exposure to raw river water contamination at this level or below on a daily basis is not anticipated to cause adverse health effects over a person's lifetime.

Note: The Result line represents the maximum value reported for Arsenic for any location for a given day on the Emory River - (See Figure 4)

Samples where Arsenic is not detected are reported at one-half the lowest concentration that laboratory instruments can reliably measure.

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Figure 2
Highest Result of Dissolved Arsenic with River Flow Overlay
TVA - Kingston - Emory River

Emory River Flow 21,404 CFS

Tennessee Fish and Aquatic Life Criterion for Continuous Arsenic Concentration

—— Arsenic, Dissolved

·········· Calculated River Flow

Ash Cell Failure

Tennessee Domestic Water
Supply Criterion For Arsenic

Maximum Result (mg/L)

Flow (cfs)

Sample Date

The Tennessee Domestic Water Supply Criterion is added to the graph for comparison purposes only. According to regulating authorities, exposure to raw river water contamination at this level or below on a daily basis is not anticipated to cause adverse health effects over a person's lifetime.
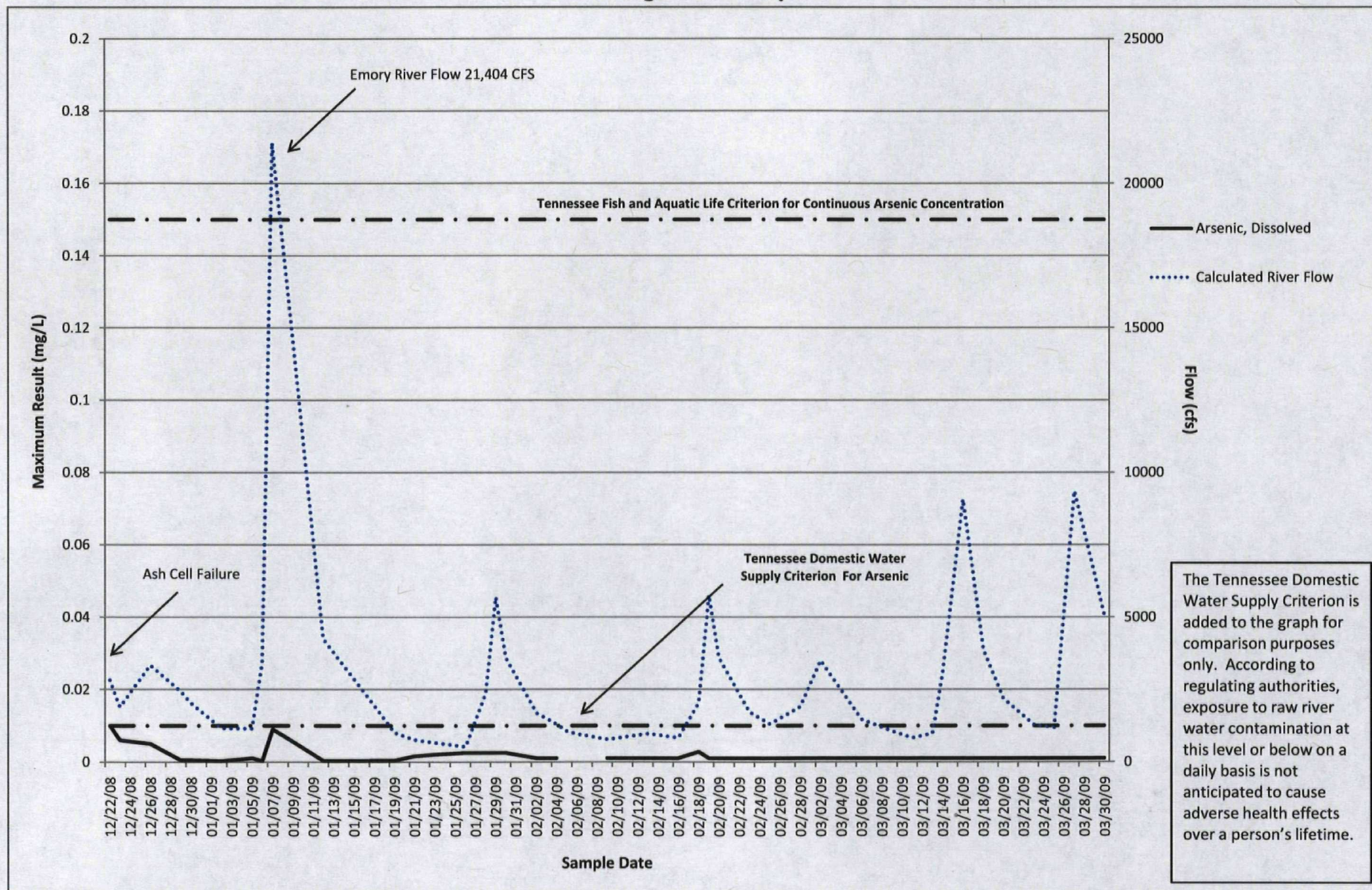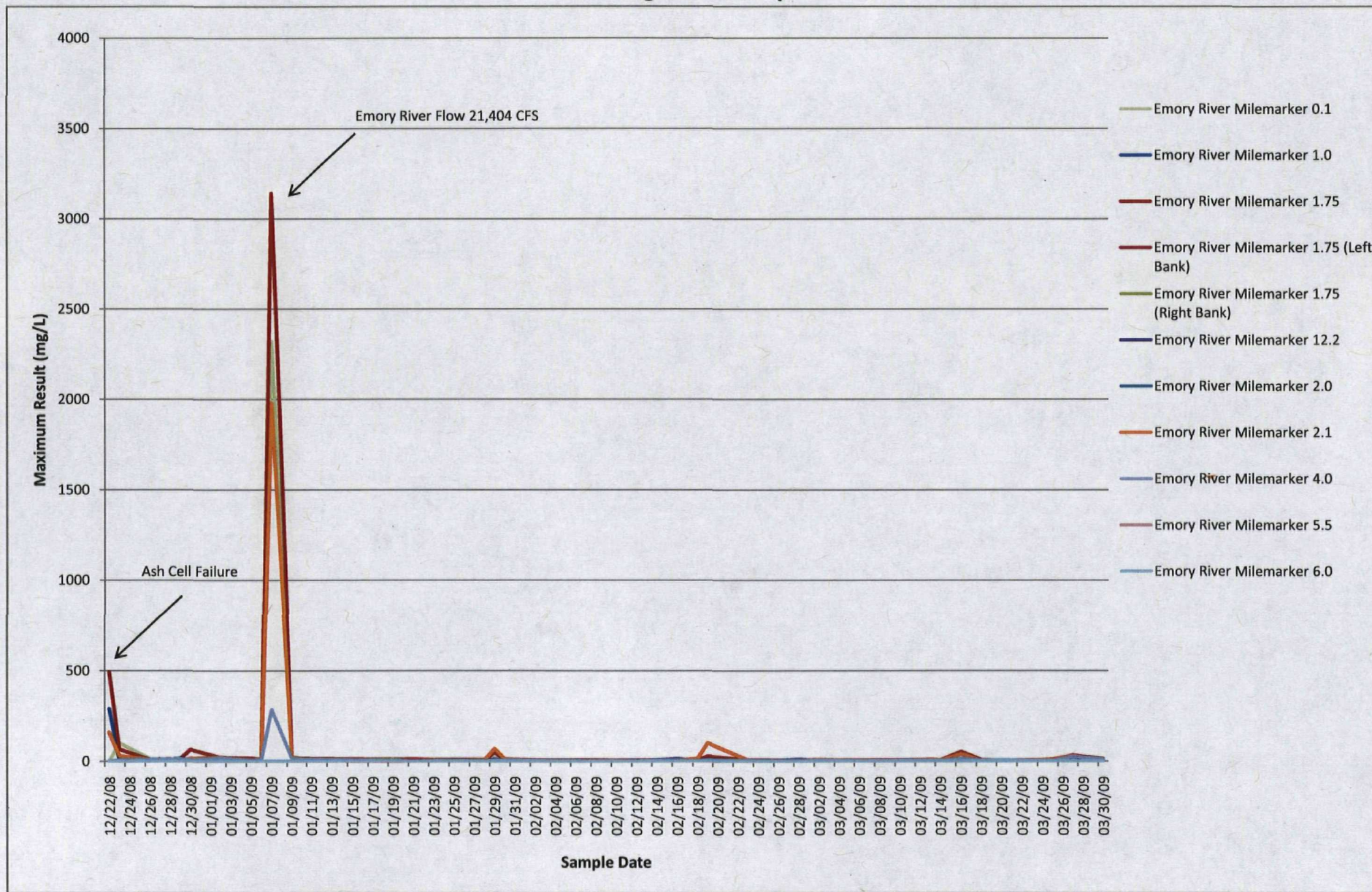
Note: The Result line represents the maximum value reported for Arsenic for any location for a given day on the Emory River (See Figure 5)

Samples where Arsenic is not detected are reported at one-half the lowest concentration that laboratory instruments can reliably measure.

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Figure 3
Total Suspended Solids
TVA - Kingston - Emory River

Emory River Flow 21,404 CFS

Ash Cell Failure

Maximum Result (mg/L)

Sample Date

Emory River Milemarker 0.1

Emory River Milemarker 1.0

Emory River Milemarker 1.75

Emory River Milemarker 1.75 (Left Bank)

Emory River Milemarker 1.75 (Right Bank)

Emory River Milemarker 12.2

Emory River Milemarker 2.0

Emory River Milemarker 2.1

Emory River Milemarker 4.0

Emory River Milemarker 5.5

Emory River Milemarker 6.0

Note: Samples where Arsenic is not detected are reported at one-half the lowest concentration that laboratory instruments can reliably measure.

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Figure 4
Arsenic, Total
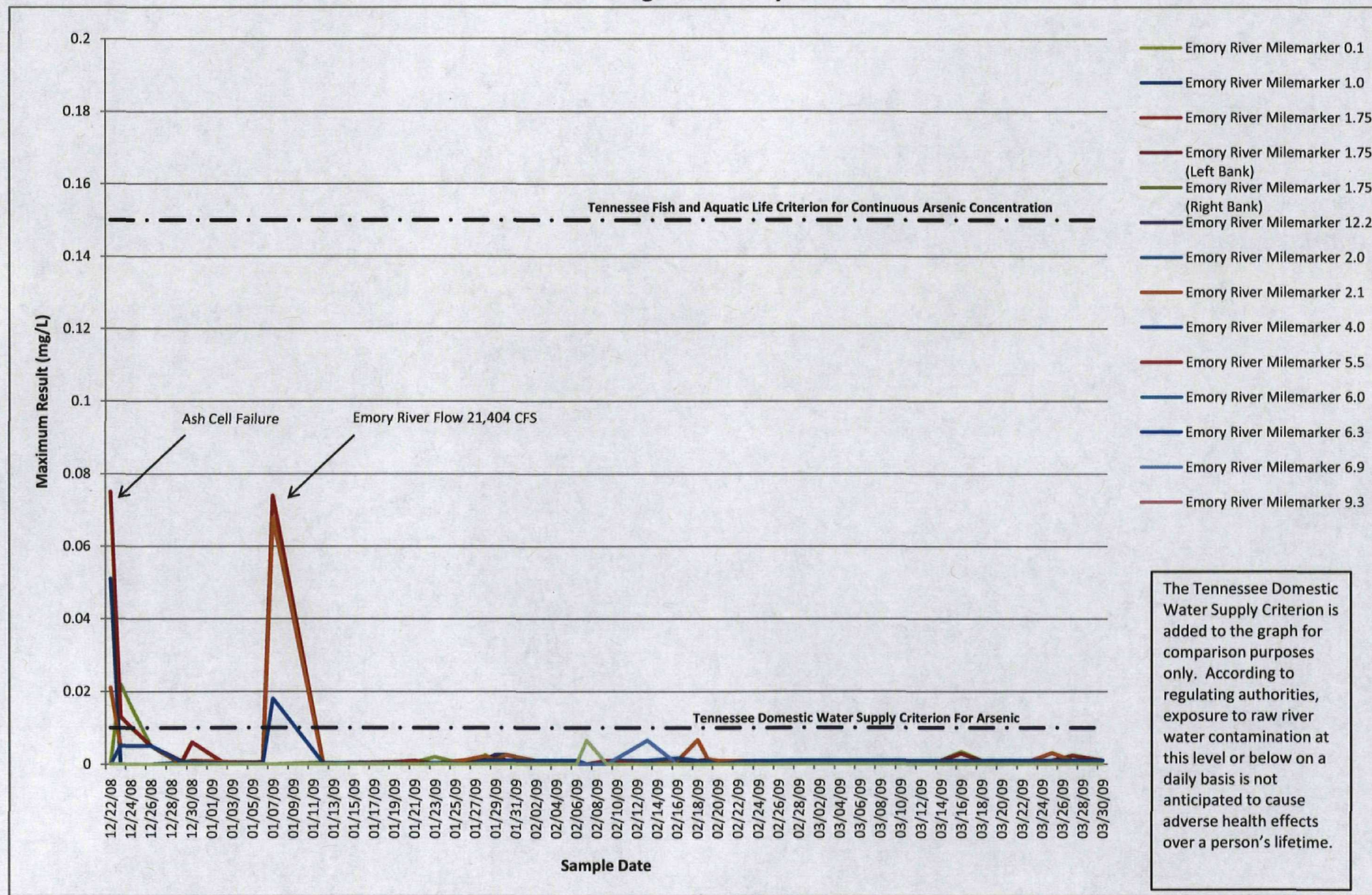# TVA - Kingston - Emory River

Note: Samples where Arsenic is not detected are reported at one-half the lowest concentration that laboratory instruments can reliably measure.
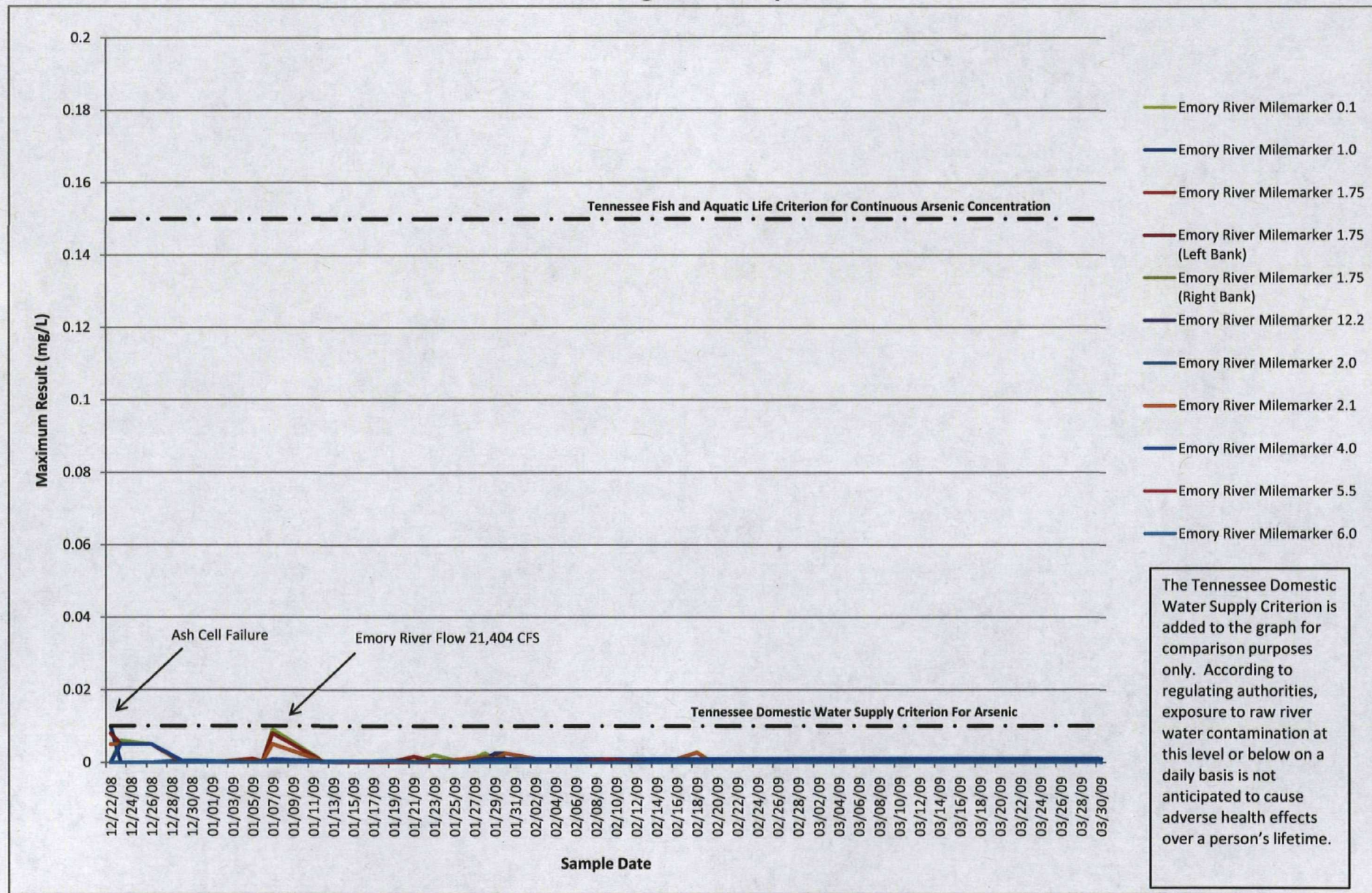
Report Generated: 4/28/2009

Figure 5
Arsenic, Dissolved
TVA - Kingston - Emory River

Maximum Result (mg/L) (y-axis, 0 to 0.2)

Tennessee Fish and Aquatic Life Criterion for Continuous Arsenic Concentration

Ash Cell Failure

Emory River Flow 21,404 CFS

Tennessee Domestic Water Supply Criterion For Arsenic

Sample Date (x-axis, 12/22/08 to 03/30/09)

Legend:
- Emory River Milemarker 0.1
- Emory River Milemarker 1.0
- Emory River Milemarker 1.75
- Emory River Milemarker 1.75 (Left Bank)
- Emory River Milemarker 1.75 (Right Bank)
- Emory River Milemarker 12.2
- Emory River Milemarker 2.0
- Emory River Milemarker 2.1
- Emory River Milemarker 4.0
- Emory River Milemarker 5.5
- Emory River Milemarker 6.0

The Tennessee Domestic Water Supply Criterion is added to the graph for comparison purposes only. According to regulating authorities, exposure to raw river water contamination at this level or below on a daily basis is not anticipated to cause adverse health effects over a person's lifetime.

Note: Samples where Arsenic is not detected are reported at one-half the lowest concentration that laboratory instruments can reliably measure.
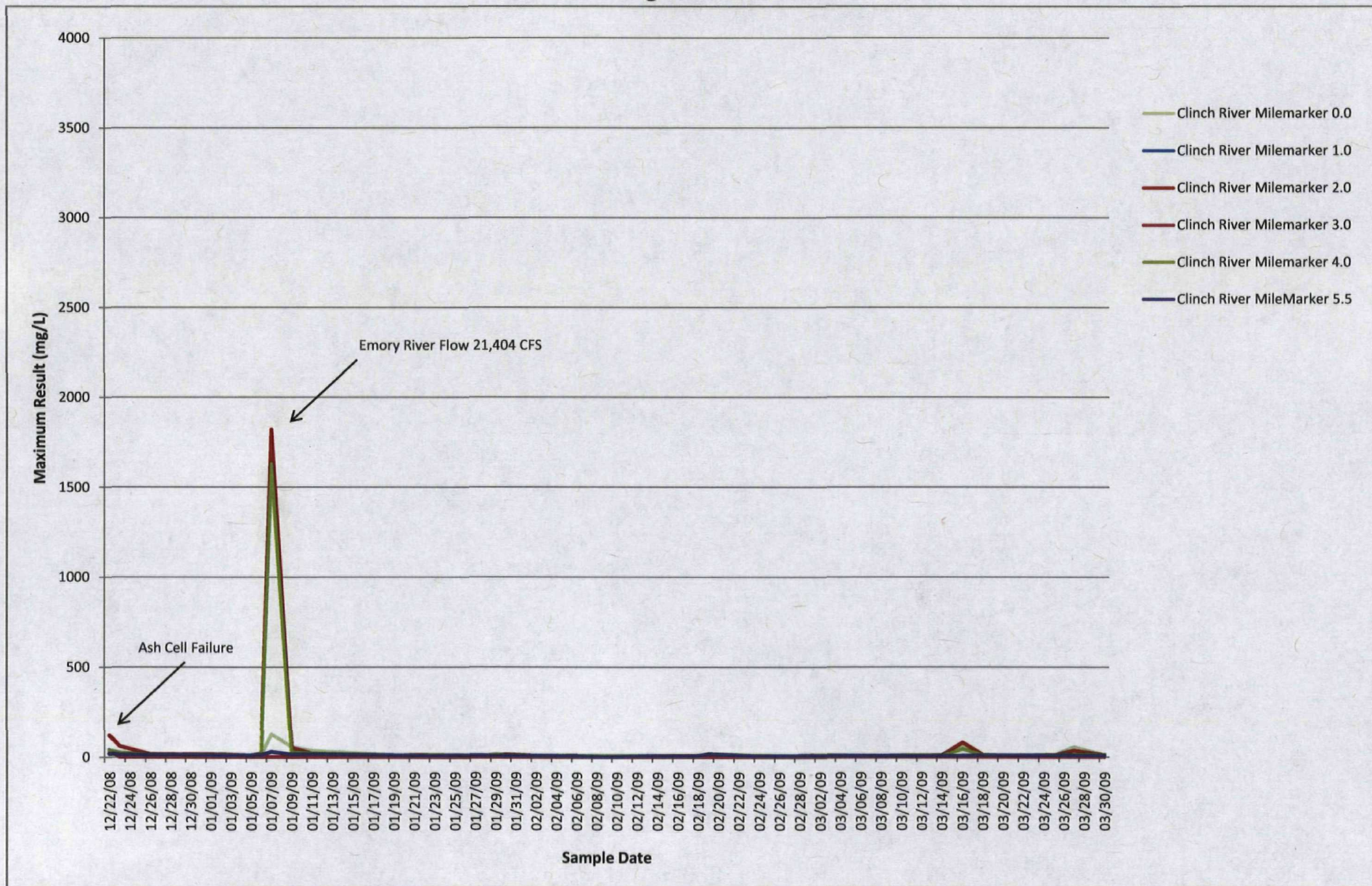
Report Generated: 4/28/2009

Figure 6
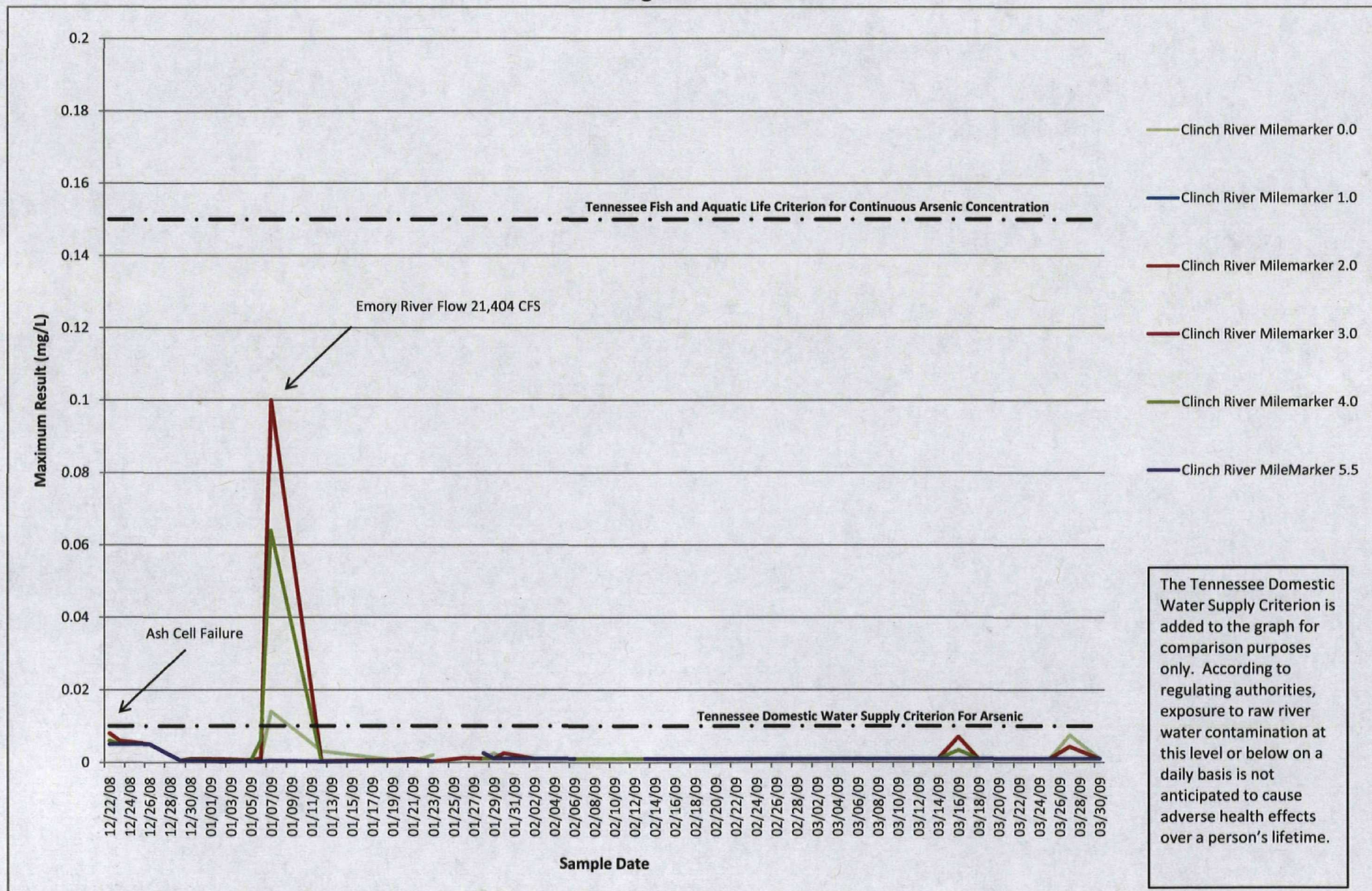## Total Suspended Solids
TVA - Kingston - Clinch River

Note: Samples where Arsenic is not detected are reported at one-half the lowest concentration that laboratory instruments can reliably measure.

Report Generated: 4/28/2009

Figure 7
Arsenic, Total
TVA - Kingston - Clinch River

Tennessee Fish and Aquatic Life Criterion for Continuous Arsenic Concentration

Emory River Flow 21,404 CFS

Ash Cell Failure

Tennessee Domestic Water Supply Criterion For Arsenic

Maximum Result (mg/L)

Sample Date

— Clinch River Milemarker 0.0

— Clinch River Milemarker 1.0

— Clinch River Milemarker 2.0

— Clinch River Milemarker 3.0

— Clinch River Milemarker 4.0

— Clinch River MileMarker 5.5

The Tennessee Domestic Water Supply Criterion is added to the graph for comparison purposes only. According to regulating authorities, exposure to raw river water contamination at this level or below on a daily basis is not anticipated to cause adverse health effects over a person's lifetime.
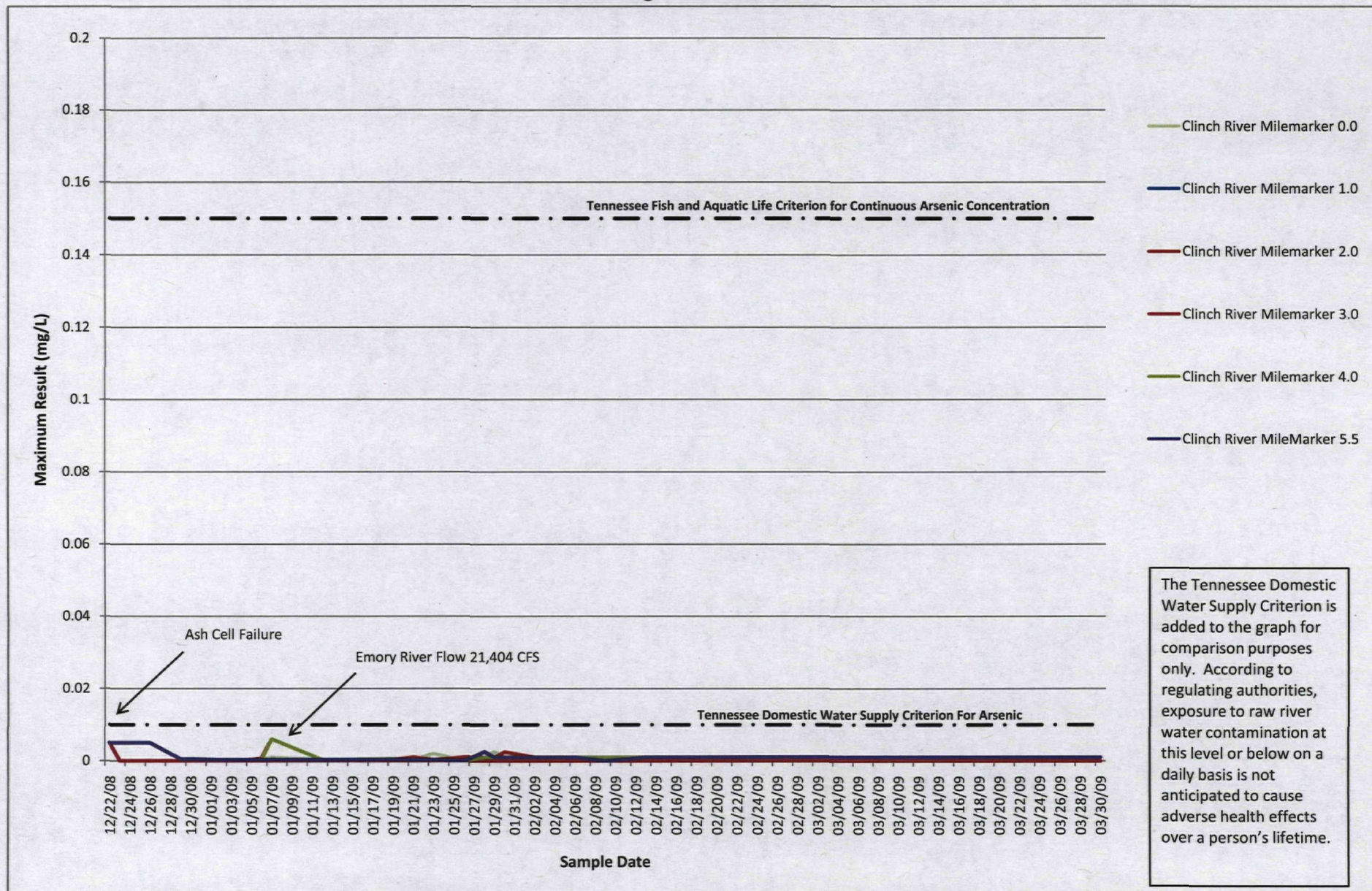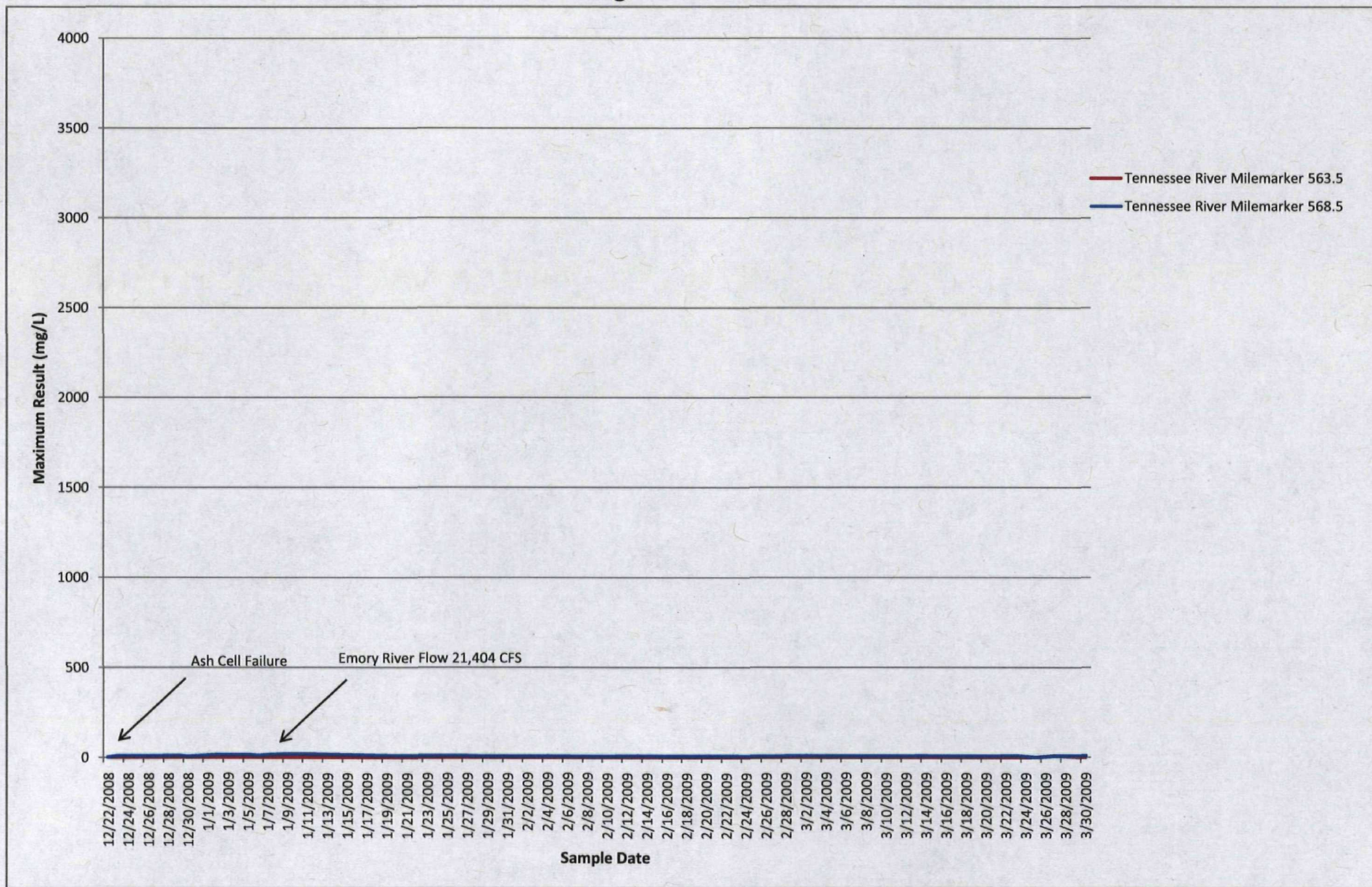
Note: Samples where Arsenic is not detected are reported at one-half the lowest concentration that laboratory instruments can reliably measure.

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Figure 8
Arsenic, Dissolved
TVA - Kingston - Clinch River

Tennessee Fish and Aquatic Life Criterion for Continuous Arsenic Concentration

Ash Cell Failure

Emory River Flow 21,404 CFS

Tennessee Domestic Water Supply Criterion For Arsenic

Maximum Result (mg/L)

Sample Date

Legend:
- Clinch River Milemarker 0.0
- Clinch River Milemarker 1.0
- Clinch River Milemarker 2.0
- Clinch River Milemarker 3.0
- Clinch River Milemarker 4.0
- Clinch River MileMarker 5.5

The Tennessee Domestic Water Supply Criterion is added to the graph for comparison purposes only. According to regulating authorities, exposure to raw river water contamination at this level or below on a daily basis is not anticipated to cause adverse health effects over a person's lifetime.
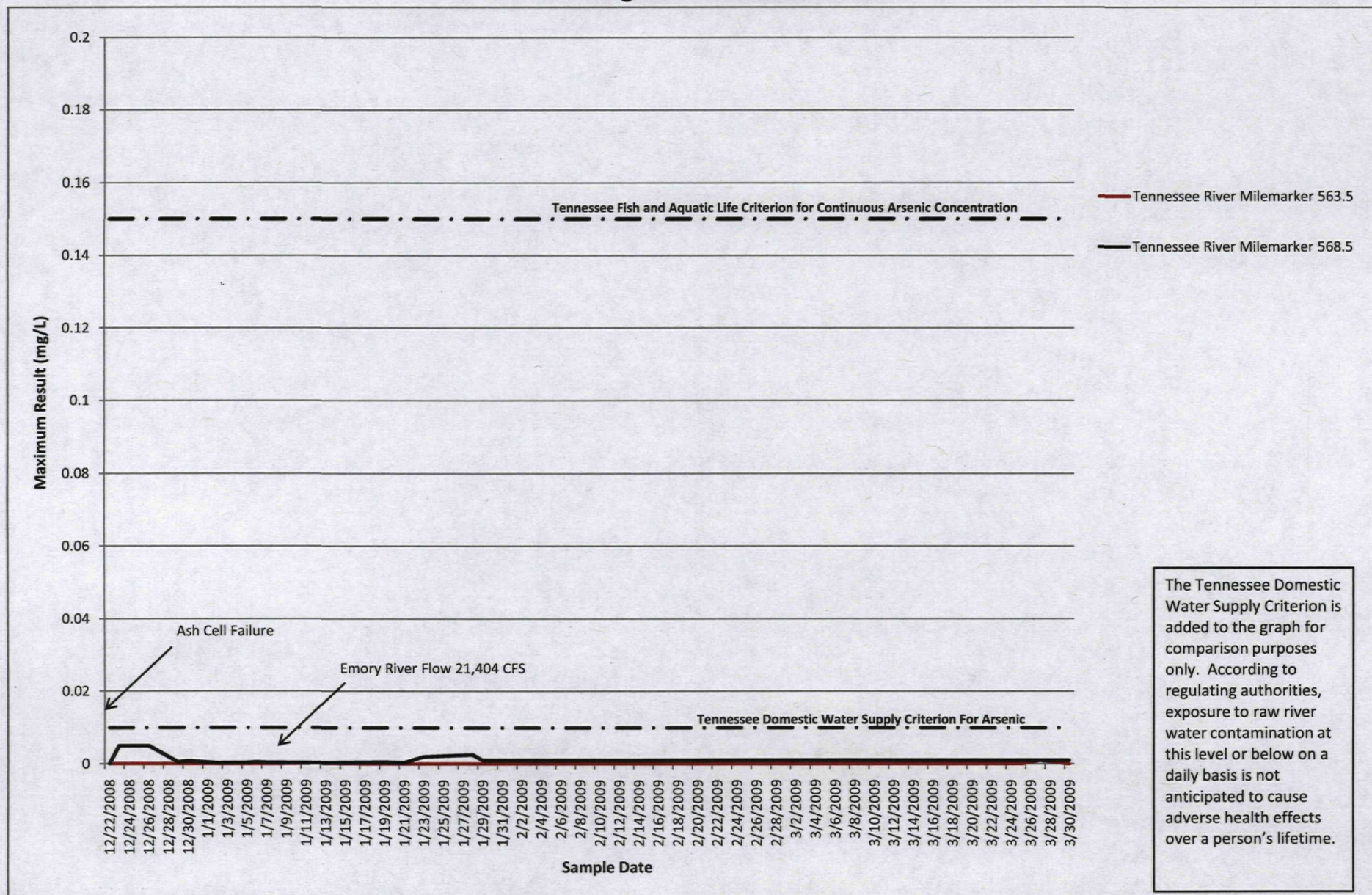
Note: Samples where Arsenic is not detected are reported at one-half the lowest concentration that laboratory instruments can reliably measure.

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Figure 9
Total Suspended Solids
TVA - Kingston - Tennessee River

Note: Samples where Arsenic is not detected are reported at one-half the lowest concentration that laboratory instruments can reliably measure.
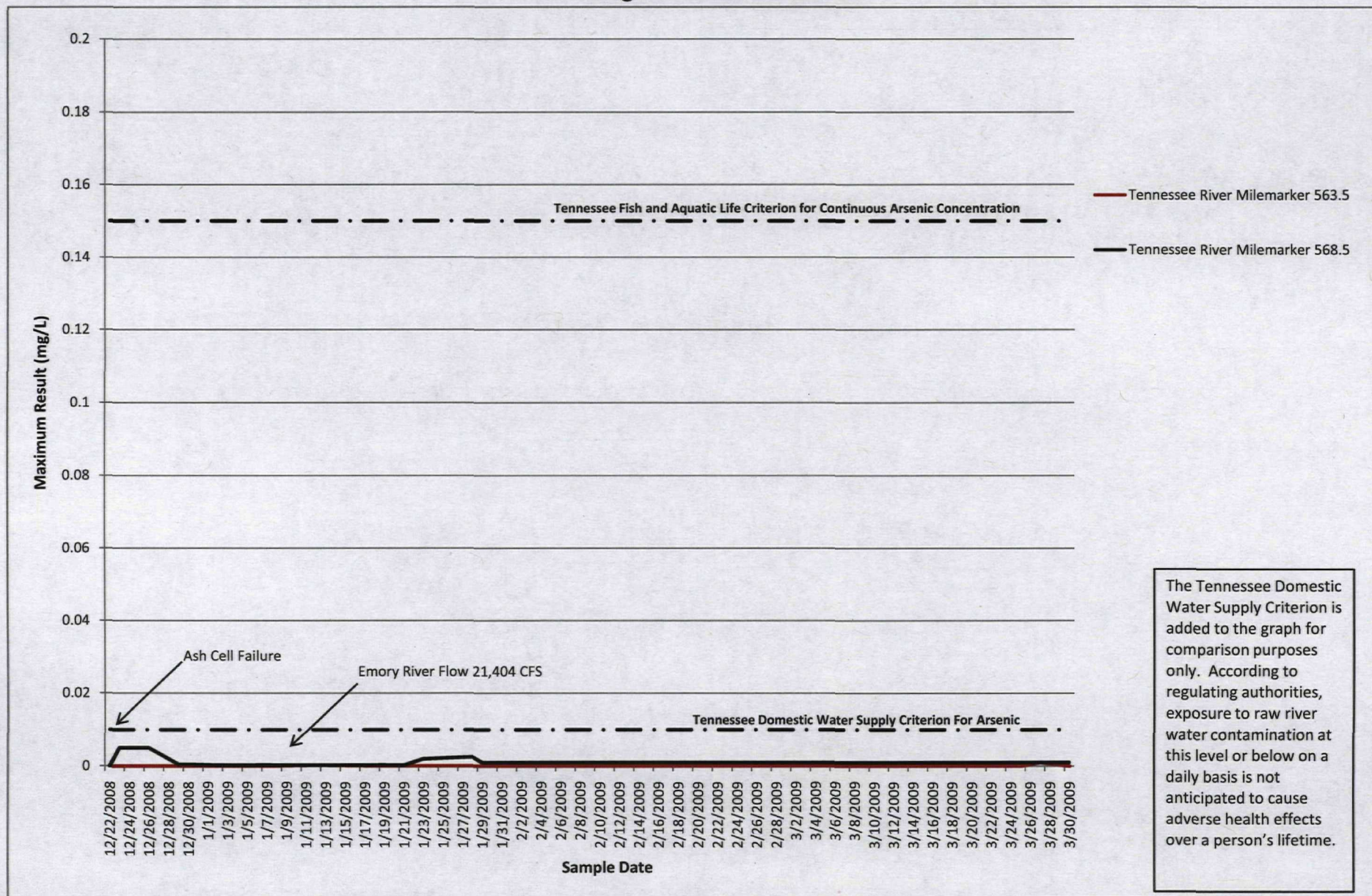
Report Generated: 4/28/2009

Figure 10
Arsenic, Total
TVA - Kingston - Tennessee River

Note: Samples where Arsenic is not detected are reported at one-half the lowest concentration that laboratory instruments can reliably measure.

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Figure 11
Arsenic, Dissolved
TVA - Kingston - Tennessee River

Tennessee Fish and Aquatic Life Criterion for Continuous Arsenic Concentration

—— Tennessee River Milemarker 563.5

—— Tennessee River Milemarker 568.5

Ash Cell Failure

Emory River Flow 21,404 CFS

Tennessee Domestic Water Supply Criterion For Arsenic

The Tennessee Domestic Water Supply Criterion is added to the graph for comparison purposes only. According to regulating authorities, exposure to raw river water contamination at this level or below on a daily basis is not anticipated to cause adverse health effects over a person's lifetime.

Maximum Result (mg/L)

Sample Date

Note: Samples where Arsenic is not detected are reported at one-half the lowest concentration that laboratory instruments can reliably measure.

Report Generated: 4/28/2009